HYDROLOGY OF RABBIT CREEK WATERSHEDS

OWYHEE COUNTY, IDAHO, 1969-70 WATER YEAR

A Report to the Boise District Office

Bureau of Land Management

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From the Northwest Watershed Research Center
Soil and Water Conservation Research Division
Agricultural Research Service
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INTRODUCTION

A cooperative study of the hydrology of two watersheds, Rabbit Creek and Little Rabbit Creek, adjoining the Reynolds Creek Experimental Watershed, was initiated in 1968. A complete description of the watersheds and instrumentation was included in the 1968-69 water year report. Operation of all facilities and instrumentation continued through the 1969-70 water year and the measurements of precipitation, runoff, soil moisture, and sediment are the basis of this report.

Since only about five percent of the precipitation is realized as runoff at the Rabbit Creek watershed outflow station, emphasis has been placed on analysis of precipitation and soil moisture data. As indicated, the watershed soils have sufficient capacity to store about 95 percent of the precipitation which is subsequently lost to evapotranspiration. The year 1969-70 was typical in this respect.

(water year Oct 1 - Sept. 30)

WATERSHED AND CLIMATIC CONDITIONS

Precipitation, snow accumulation, and soil moisture storage were about normal during the 1969-70 water year; therefore, grazing conditions were generally favorable. Warm temperatures and nearly two weeks of intermittent rain in January 1970 melted much of the snow, but runoff rates were low, indicating that ample soil-moisture holding-capacity was available in the soil profile. Similarly, the cooler temperatures of April and early May caused the snowdrifts to melt slowly and streamflow peaks were again low. In general, grazing conditions and appearance of vegetation were slightly better than normal.

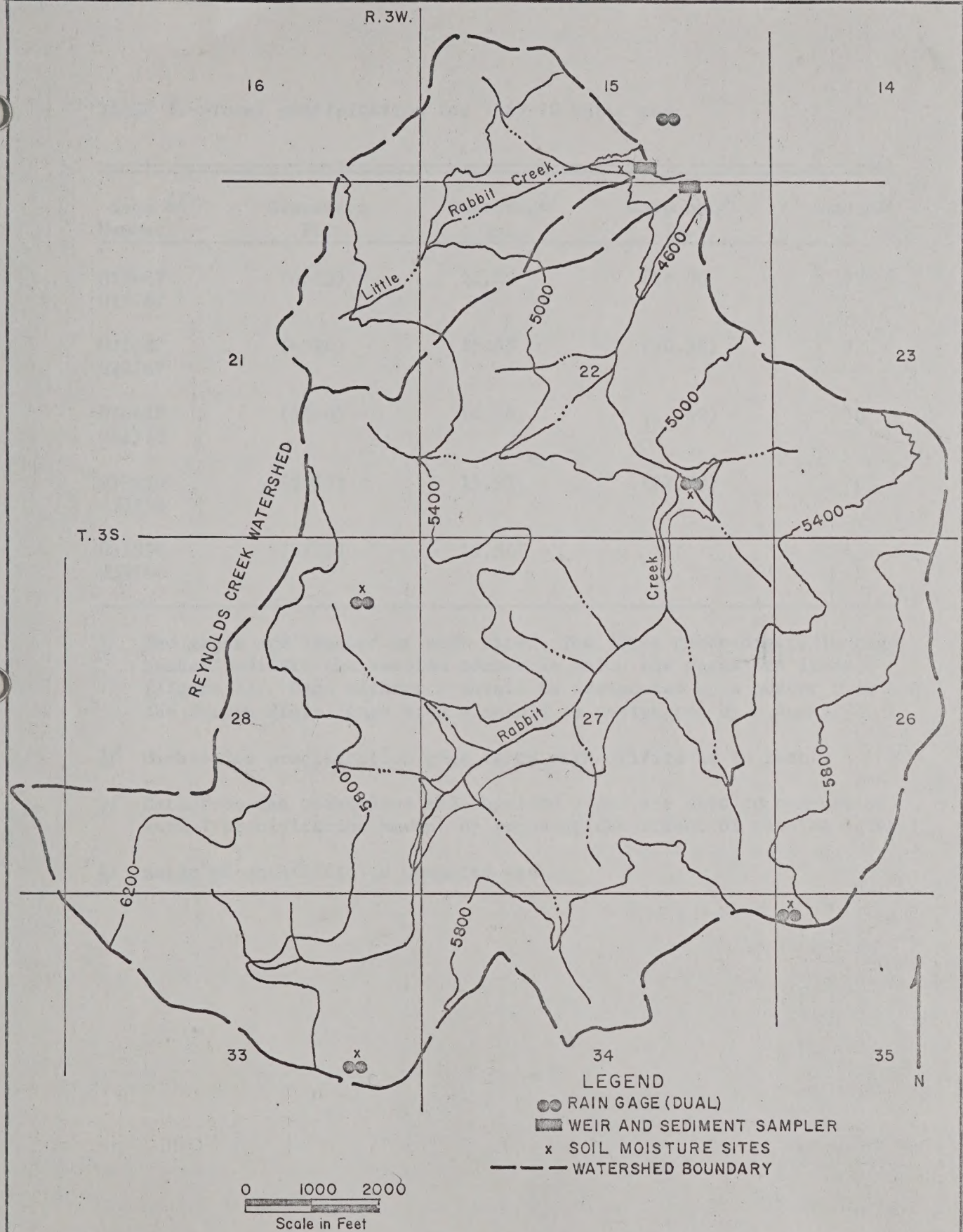
PRECIPITATION

Precipitation data were obtained from the five sites during the 1969-70 water year. Locations of the gages are shown in Figure 1. Water year totals for both unshielded gage catch and computed actual catch, along with gage elevation, are tabulated in Table 1.

Daily totals for the unshielded gages are listed in Tables 2-6 and computed totals are listed in Tables 7-10.[1/]

As noted in Table 1, the ratio of unshielded catch to computed (actual) precipitation ranges from 77 percent at lower sites to 70 percent at higher sites where the windspeed is greater. The increase in precipitation per thousand feet on the basis of the unshielded gage catch is about three inches, but on the basis of computer values this increase is about five inches.

1/ Data from gages 035600 and 035700 were not sufficiently reliable to obtain computed values.



RABBIT CREEK WATERSHEDS
OWYHEE COUNTY, IDAHO
JANUARY, 1970

FIGURE 1.

TABLE 1.--Total precipitation for 1969-70 water year.

Gage 1/ Number	Elevation Ft.	Observed 2/ In.	Computed 3/ In.	Ratio 4/ %
015687 015787	(4615)	12.29	(16.06)	77
022687 022787	(4920)	15.55	(20.32)	77
028618 028718	(5690)	14.96	(21.69)	70
033658 033758	(5875)	15.92	(22.70)	70
035600 035700	(5790)	13.36?	?	?

1/ Two gages are located at each site. The first three digits in gage number indicate the section number in which the gages are located (Figure 1). Gage without a shield is designated by a number 6 in the fourth digit; gage with a shield is designated by a number 7.

2/ Unshielded precipitation gage catch with orifice at 10 feet.

3/ Data from the unshielded and shielded gages are used to compute an actual precipitation amount by removing the effect of wind on catch.

4/ Ratio of unshielded to computed catch.

Table 2.

WATERSHED AND HYDROLOGIC STUDIES 1969-70 Water Year

GAGE 015687

RABBIT CREEK WATERSHED

Daily Precipitation in Inches

Month / Day	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.08					.03						
2	.14					.01						
3												
4												.55
5		.01								.35	.09	.06
6		.17						.03	.01	.04		
7						.47			.06			
8	.08		.16	.07		.07		.10	.01	.04		
9			.01	.08				.17	.01			
10	.19		.01	.06			.31	.10	.12			
11			.10			.10						
12			.01	.03	.18							
13				.01			.27	.05	.05			
14				.13		.13	.25		.03			
15	.07	.02				.01						
16	.07	.03		.27	.10	.31				.01		
17	.32			.15	.23	.09			.18			
18				.06								
19			.16	.05			.19					.23
20			.13	.01				.07		.03		.09
21			.16	.44								
22				.35				.08				
23			.20	.05				.33	.08			
24				.21								
25			.05				.10					
26				.33		.07	.09	.04	.05			
27	.12			.43			.01		.26	.04		
28	.04				.14		.05		.31			
29						.02			.12			
30						.07					.05	
31				.03							.06	
TOTAL	1.11	0.23	0.99	2.76	0.65	1.38	1.27	0.97	1.29	0.51	0.20	0.93

WATER YEAR TOTAL 12.29 INCHES.

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Dec 1958

AGRICULTURAL RESEARCH SERVICE
SOIL AND WATER CONSERVATION RESEARCH DIVISION

Table 3.

GAGE 015687
022687 ??

WATERSHED AND HYDROLOGIC STUDIES
RABBIT CREEK WATERSHED
Daily Precipitation in Inches

1969-70 Water Year

Day \ Month	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.22					.08						
2	.03					.07						
3												
4			.03									.66
5		.02						.03		.48	.09	.06
6		.15						.01	.01	No Data		
7						.51						
8	.11		.14	.14		.11		.10	.02			
9	.03		.02	.14				.19	.03			
10	.12		.04	.10			.37	.20	.08			
11			.19			.13	.01					
12			.02	.08	.20			.05				
13			.01	.02			.31	.04	.07			
14				.16		.20	.49	.01	.03			
15	.19	.05										
16	.41	.03		.33	.13	.39						
17	.02			.24	.28	.11			.06			
18				.10								
19			.17	.11			.20	.01				.33
20			.20	.03				.04		.02		.09
21			.35	.46								
22			.01	.37				.05				
23			.25	.06				.37	.11			
24				.16								
25			.06	.58			.13					
26			.05			.10	.14	.03	.05			
27	.11			.70					.27	.03		
28	.05				.18		.08		.38			
29						.03	.01		.12			
30						.09			.03		.11	
31				.05							.03	
TOTAL	1.29	0.25	1.54	3.83	0.79	1.82	1.74	1.15	1.26	0.53	0.23	1.14

WATER YEAR TOTAL 15.55 INCHES

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Table 4. **WATERSHED AND HYDROLOGIC STUDIES** 1969-70 Water Year

GAGE 033658

RABBIT CREEK WATERSHED

Daily Precipitation in Inches

Day \ Month	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.11					.04						
2	.17					.06			.01			
3					.02							
4			.03									.72
5		.05						.03		.54	.07	.08
6		.15						.01	.05	.03		
7		.02	.01			.52						
8	.14		.14	.08		.06		.19	.08			
9			.01	.15				.18	.01			
10	.20		.06	.09			.39	.14	.20			
11			.34	.03		.04	.01	.02				
12			.08	.07	.15			.01				
13			.01	.03			.14	.04	.07			
14				.13		.17	.31		.02			
15	.06	.08				.01			.01			
16	.20	.02		.55	.19	.20						
17	.36			.20	.15	.02			.05			
18				.16								
19			.29	.11			.10					.38
20			.20	.02				.16		.03		.10
21			.36	.55				.01		.02		
22			.02	.33				.06				
23			.19	.06				.49	.10			
24				.25					.01			
25			.08	.04			.04					
26			.03	.62		.07	.06	.04	.04			
27				.68			.03	.01	.27	.03		
28	.10				.08				.61			
29						.04			.25			
30						.03					.12	
31				.01							.03	
TOTAL	1.34	0.32	1.85	4.16	0.59	1.26	1.08	1.39	1.78	0.65	0.22	1.28

WATER YEAR TOTAL 15.92 INCHES

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Table 5. **WATERSHED AND HYDROLOGIC STUDIES** 1969-70 Water Year

RABBIT CREEK WATERSHED

GAGE 035600 Daily Precipitation in Inches

Month / Day	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.11					.04						
2	.29											
3												
4			.01									.58
5		.04						.03		.17	.05	.05
6		.20					.01	.03	.04			
7						.44						
8	.12		.08	.02		.03		.16	.01	.18		
9			.01	.04				.12	.02			
10	.07	.01	.03	.04			.35	.08	.08			
11			.07			.08		.01				
12			.02	.03	.10			.01	.02			
13	.02		.02				.16 .01+	.04	.05			
14			.01	.07		.13	.32 .05+		.02			
15		.06										
16	.12	.02		.25	.13	.15				.17		
17	.33			.16	.08				.10			
18				.16								
19			.25	.15			.06 .01+					.49
20			.17	.01				.13		.05		.09
21			.39	.47			.03					
22				.49				.02				
23			.07	.05				.55	.11			
24				.23								
25			.05				.08					
26			.03	.48		.02	.07	.05	.07			
27	.02			.60			.02	.03	.43	.15		
28	.03				.04				.50			
29						.02			.21			
30											.16	
31				.03							.04	
TOTAL	1.11	0.33	1.21	3.28	0.35	0.91	.07 0.63+	1.26	1.66	0.72	0.25	1.21

WATER YEAR TOTAL 12.92+ INCHES

Estimate 13.36 inches

+Gage not responding properly.

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Table 6. **WATERSHED AND HYDROLOGIC STUDIES** 1969-70 Water Year

RABBIT CREEK WATERSHED

GAGE 028618 Daily Precipitation in Inches

Month / Day	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.16				.03	.05						
2	.07			.01		.04						
3					.01							
4		.03	.02									.62
5		.03								.41	.17	.06
6		.17						.02		.08		
7		.02	.01		.01	.51			.01			
8	.07		.11	.12		.14		.18	.05			.02
9	.01			.12				.20				
10	.20		.02	.11		.01	.37	.19	.19			
11			.18			.10	.01	.02		.02		
12			.08		.14							
13			.01	.02			.36	.06	.09			
14				.14		.12	.26		.04			
15	.03	.03										
16	.17	.04	.01	.50	.15	.36						
17	.29			.20	.15	.13			.05			
18				.12								
19			.21	.06			.07					.29
20			.24	.03				.13		.04		.10
21			.26	.45								
22			.01	.36				.07				
23			.25					.49	.06			
24				.21								
25			.02				.11					
26			.01	.42		.10	.18	.06	.06			
27	.03			.61					.30	.01		
28	.03				.10	.03	.06		.44			
29						.02	.01	.01	.20			
30						.14					.10	
31											.05	
TOTAL	1.06	0.32	1.44	3.48	0.59	1.75	1.43	1.43	1.49	0.56	0.32	1.09

WATER YEAR TOTAL 14.96 INCHES

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Table 7. **WATERSHED AND HYDROLOGIC STUDIES** 1969-70 Water Year

GAGES 015687
015787

RABBIT CREEK WATERSHED
Computed Precipitation in Inches

Day \ Month	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.10					.04						
2	.18					.01						
3												
4												.58
5		.01								.35	.09	.06
6		.18						.06	.01	.04		
7						.62			.06			
8	.08		.27	.15		.09		.01	.01	.04		
9			.02	.17				.18	.01			
10	.19		.02	.13			.62	.10	.12			
11			.17			.13						
12			.02	.06	.22							
13				.02			.54	.05	.05			
14				.19		.22	.50		.03			
15	.07	.02				.02						
16	.07	.03		.29	.12	.52				.01		
17	.37			.16	.28	.15			.18			
18				.06								
19			.21	.05			.27					.26
20			.17	.01				.07		.03		.10
21			.21	.47								
22				.37				.09				
23			.26	.08				.37	.08			
24				.38								
25			.07				.19					
26				.60		.12	.17	.04	.05			
27	.12			.78			.02		.26	.04		
28	.04				.18		.09		.31			
29						.02			.12			
30						.07					.05	
31				.03							.06	
TOTAL	1.22	.24	1.42	4.00	.80	2.01	2.40	.97	1.29	.51	.20	1.00

WATER YEAR TOTAL 16.06 INCHES

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Table 8. **WATERSHED AND HYDROLOGIC STUDIES** 1969-70 Water Year

GAGES 022687
022787

RABBIT CREEK WATERSHED
Computed Precipitation in Inches

Day \ Month	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.26					.10						
2	.03					.09						
3												
4			.03									.73
5		.02						.06		No .45 Data	.09	.07
6		.15						.02	.01	No .05 Data		
7		.05				.87						
8	.14	.03	.20	.32		.19		.11	.02			
9	.04		.03	.26				.21	.03			
10	.15		.06	.18			.37	.22	.08			
11			.27			.17	.01					
12			.03	.15	.26			.06				
13			.01	.04			.62	.04	.07			
14				.23		.27	.98	.01	.03			
15	.24											
16	.50			.37	.17	.53						
17	.02			.27	.36	.21			.06			
18				.11								
19			.22	.11			.31	.01				.33
20			.25	.03				.04		.02		.09
21			.44	.49								
22			.01	.40				.05				
23			.32	.08				.37	.11			
24				.22								
25			.08	.82			.25					
26			.06			.20	.27	.03	.05			
27	.12			.99					.28	.03		
28	.06				.23		.15		.39			
29						.07	.02		.12			
30						.18			.03		.12	
31				.05							.03	
TOTAL	1.56	.25	2.01	5.12	1.02	3.94	2.98	1.23	1.28	.53	.24	1.22

WATER YEAR TOTAL 20.32 INCHES

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Table 9. **WATERSHED AND HYDROLOGIC STUDIES** 1969-70 Water Year

GAGES 033658
033758

RABBIT CREEK WATERSHED
Computed Precipitation in Inches

Day / Month	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.11					.08						
2	.17					.12			.01			
3					.02							
4			.03									.72
5		.06						.18		.57	.07	.08
6		.18						.06	.06	.03		
7		.02	.02			.77						
8	.31		.33	.11		.09		.29	.09			
9			.02	.21				.27	.01			
10	.44		.14	.13			.43	.21	.23			
11			.80	.04		.06	.04	.03				
12			.19	.10	.19			.02				
13			.02	.04			.63	.06	.08			
14				.18		.35			.02			
15	.07	.10				.02			.01			
16	.25	.02		.76	.24	.41						
17	.44			.28	.19	.04			.06			
18				.22								
19			.29	.11			.25					.41
20			.24	.02				.24		.03		.11
21			.42	.55				.02		.02		
22			.07	.33				.07				
23			.65	.11				.54	.11			
24				.45					.01			
25			.17	.07			.24					
26			.06	.66		.14	.36	.04	.04			
27				.72			.18	.01	.29	.03		
28	.22				.15				.65			
29						.32			.27			
30						.24					.12	
31				.01							.03	
TOTAL	2.01	.38	3.45	5.10	.79	2.64	2.13	2.04	1.94	.68	.22	1.32

WATER YEAR TOTAL 22.70 INCHES

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Table 10. **WATERSHED AND HYDROLOGIC STUDIES** 1969-70 Water Year

GAGES 028618
028718

RABBIT CREEK WATERSHED
Computed Precipitation in Inches

Day \ Month	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
1	.16				.03	.06						
2	.07			.08		.05						
3					.01							
4		.03	.04									.62
5		.03								.41	.17	.06
6		.17						.02		.08		
7		.02	.02		.01	.66			.01			
8	.10		.24	.93		.18		.20	.05			.02
9	.01			.93				.22				
10	.28		.04	.85		.01	.37	.21	.19			
11			.40			.13	.02	.02		.02		
12			.18		.14							
13			.02	.02			.74	.06	.09			
14				.16		.17	.54		.04			
15	.04	.03										
16	.23	.04	.02	.56	.26	.52						
17	.40			.23	.26	.19			.05			
18				.14								
19			.23	.07			.32					.36
20			.26	.03				.14		.04		.12
21			.54	.51								
22			.02	.41				.07				
23			.52					.49	.06			
24				.24								
25			.04				.23					
26			.02	.46		.19	.37	.06	.06			
27	.03			.66					.30	.01		
28	.03				.17	.06	.06		.46			
29						.04	.01	.01	.21			
30						.27					.10	
31											.05	
TOTAL	1.35	.32	2.59	6.28	.88	2.53	2.66	1.50	1.52	.56	.32	1.18

WATER YEAR TOTAL 21.69 INCHES

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SOIL MOISTURE

Soil moisture data were obtained from a number of the soil moisture sites located in the vicinity of the precipitation gages. Selected soil moisture profiles for sites in sections 15 and 33, Figure 1, are included in Table 11. These data are also used in the section on Water Balance Computation. Drill logs for all soil moisture sites are presented in Table 12.

Table 11. SOIL MOISTURE DATA FROM SELECTED PROFILES

Date	Tube Number and Depth	
	15194 (0-6') (Inches)	33234 (0-5') (Inches)
9-29-69	21.1	8.8
10-30-69	21.5	9.7
12-02-69	21.4	9.5
2-12-70	26.9	18.1
3-12-70	26.7	17.3
3-26-70	25.8	16.7
4-09-70	24.9	15.4
5-09-70	25.5	17.1
6-18-70	25.2	15.3
7-02-70	24.4	14.4
7-22-70	23.4	12.9
7-30-70	22.4	12.4
8-14-70	22.1	11.0
8-27-70	21.6	10.5
9-10-70	21.7	10.8
9-24-70	21.3	10.7

Table 12. Drill Logs for Soil Moisture Sites

Hole No.	Date Drilled	Depth	Description
15194	9-25-69	0-1'	Soil-Dark gray, loamy, no rocks
		1'-4'	Dark hard damp clay
		4'-4.5'	Dark clay with some granite gravel
		4.5'-5.0'	Light brown clay
		5'-6'	Light brown clay with few rocks
		6'-7'	Light brown clay, damp
		7'-8'	Light clay, streaks of dark clay with some rocks
			Bottom of hole 8 ft., with top of pipe 8 inches above ground.
15294	9-25-69	0"-7"	Dark gray silty soil, few rocks
		7"-2.5'	Dark clay soil
		2.5'-3.5'	Grades to silica sand and dk. clay
		3-5'-4.5'	Fine-grained silty loam, less clay
		4.5'-5.75'	Grading into harder decomposed granite
		5'9"	Bottom of hole-hard granite. Top of tube 8" above ground.
15394	9-25-69	0"-7"	Red rocky soil
		7"-4'10"	Contact dry clay loam
		4'10"-6.9'	Altered, vesicular basalt, alternating w/rock and clay
		6'11"	Bottom of hole hard basalt bedrock. Pipe 8" above ground, 6'8" in ground.
22177	6-12-69	0-10"	Rocky drk. gray dry soil
		10"-1'4"	Little darker, less rock. Soil some wetter.
		1'4"-1'10"	Big rocks with some clay
		1'10"-2'6"	Soft broken, dry rhyolite with some soil material.
		2'6"-3'	Light grey, spongy rhyolite
		3'-4'	Soft, cindery material of glass, rhyolite and granitic sands.
		4'-5.5"	Same, very unconsolidated, very loose zone of tuff and rhyolite glass, and other unconsolidated fragments.
		5'5"	Bottom of hole. Pipe 7" above ground.
22277	6-12-69	0-6"	Very rocky soil, some clay, damp.
		6"-12"	Less rock, more clay, wet.
		1'-1'3"	Wetter, few smaller gravels and clay.
		1'3"-1'4"	Larger rock.
		1'4"-1'9"	Rocks and clay with some soil material.
		1'9"-3'	Broken rhyolite - soft and rotten.
		3'8"	Solid, hard rhyolite. Bottom of hole.

Table 12 (Continued)

Hole No.	Date Drilled	Depth	Description
22377	6-12-69	0-10"	Heavy organic material, few rocks and sand quite dry.
		10"-2'	More loamy, less rocks, dry.
		2'-2½'	Damp with some clay.
		2½'-2-3/4'	Drier and sandy
		2-3/4'-5½'	Dry and wetter soil, some rocky material.
		5½'-7½'	Rocks, rhyolitic, very rotten and broken fragments.
		7½'-8'	Layer of micaceous sand. Wet clay and sand interbedded with some gravels.
		9.3'	Rhyolite bedrock at 9'. Bottom of hole 9.3'. Pipe 7" above ground.
28108	6-13-69	0-10"	Rocky soil, slightly damp.
		10"-1'3"	Rocky loam, some clay.
		1'3"-2'	Rotten basaltic rock (latite) and red and white tuffaceous ash and red clay.
		2'-5'	Mostly tuffaceous ash with alterations to clay; yellow grey.
		5'	Bottom of hole. Pipe 7" out of hole.
28208	6-13-69	0-1'	Rocky (small) loamy soil - dry with some clay fragments at 1'.
		1'-2'	Clay with some sandy fragments - grades into bedded tuff.
		2'-6'2"	Bedded tuff. Bottom of hole. Pipe above ground 4".
28308	6-13-69	0-8"	Slightly damp, slightly rocky soil.
		8"-1½'	Clay - nearly dry.
		1½'-1-3/4'	Dry tuff, grades into wet tuffaceous clay; yel.-gray.
		1-3/4'-2'	Wet tuff clay, grades back into dry tuff.
		2'-2½'	Dry tuff.
		2½'-3½'	Wet tuffaceous clay - redish brown.
		3½'-6'6"	Grades into yel-gray drier tuff. Bottom of hole 6'6". Pipe 5" above ground.
28608	9-23-69	0-6"	Rocky soil - very dry.
		6"-10"	Sandy loam - some clay loam.
		10"-12"	Red loam.
		12"-13"	Little coarse sand and some clay at 12" - dark red.
		13"-5½'	Dark red to brown clay, dry, grades to tan at 1½'.
		5½'-6½'	Clay, grades into altered ash and/or basaltic fragments. Reddish gray.
		6½'-8½'	Grades into white volcanic ash.

Cont.

Table 12 (Continued)

Hole No.	Date Drilled	Depth	Description
28608 Continued			Hole 8½' deep; 8'11" of pipe in ground - 5" above ground.
28708	9-24-69	0-1.5'	Rock soil, very dry.
		1.5'-3.0'	Clay, damp to dry, dark yellow-brown; grading to drier.
		3.0'-3.5'	Very dry loam - lt. gray.
		3.5'-7.0'	Grades into dark reddish brown loam with some dry clay; appears to be from altered ash.
			Bottom of hole 7' deep; pipe 8" out of ground.
33134	6-11-69	0-8"	Damp, dark gray-black soil.
		8"-1'	Clay with soil
		1'-2½'	Dry, light grey fine loam.
		2½'-4'	Harder-cuttings look like mixture of ash, basalt fragments - no soil material, dry.
		4'-6½'	Darker fragments, rock, no soil.
		6½'	Bottom of hole. Pipe nearly flush with ground.
33234	6-11-69	0-6"	Gravelly, grey-brown, loose, nearly dry soil.
		6"-1½'	Some clay, brown, gravelly loamy soil.
		1½'-2½'	Getting dry at 2' - darker brown, finer soil, fewer rocks
		2½'-5'	Grey-brown fine sand soil, no clay, grades into fine, powdery, spongy, light grey rhyolite.
		6'-8¼'	More solid rhyolite bedrock.
		8¼'	Bottom of hole. Pipe 7" above hole.
33334	6-11-69	0-10"	Black soil, heavy organic material.
		10"-3'	Becomes sandy loam.
		3'-5.4'	Clay
		5.4'	Bottom of hole.
35110	6-11-69	0-6"	Damp soil with few gravel-size rocks.
		6"-1.5'	Dry, rock soil - mostly rock.
		1.5'-4'	Soft, dry, powdery material with 15% coarse sand-size grains.
		4'-5½'	Same, but harder.
		5½'-9'	Soft spongy rhyolite bedrock, very soft.
			Bottom of hole at 9'. Pipe 8" above surface.

Table 12 (Continued)

Hole No.	Date Drilled	Depth	Description.
35210	6-11-69	0-8"	Damp soil.
		8"-2'	Fine loamy soil, few rocks - gravel size to sand size.
		2'-6'	Same with clay layers coming in. Clay moist, alternating bands of clay in soil material.
		6'-6½'	Very wet sandy clay; water stands after a few minutes.
		6½'-8½'	Very wet sandy clay.
		8½'-9½'	Very wet clay, very little sand.
		9½'-11½'	Bedrock - basaltic.
			Bottom of hole at 11½'. Pipe 7" above ground surface. Hole open to 9'. Pipe bent on installation.
35310	6-11-69	0-10"	Damp top soil.
		10"-1½'	Dry, powdery soil with few sands.
		1½'-3'	Very dry, grey, fine loam.
		3'-5'	Very light grey to white spongy rhyolite
		5'	Bottom of hole. Pipe 7" above ground.

RUNOFF

Runoff data for the Rabbit Creek and Little Rabbit Creek Watersheds are summarized in Table 13. Daily discharges are tabulated in Tables 14 and 15.

Table 13. Summary of Runoff Data for Rabbit Creek and Little Rabbit Creek Watersheds, 1969-70 Water Year.

Watershed Name 1/	Area (Acres)	Water Yield (Inches)	Peak Discharge (c.f.s.)	Peak Discharge Date	Minimum Flow (c.f.s.)
Rabbit Creek	2360	.93	2.07	1-27-70	0.11
Little Rabbit Creek	350	.70	.53	1-27-70	0

1/ Watersheds are located in Figure 1.

Streamflow in the Rabbit Creek Watersheds originates as visible springs and seeps along the stream channels, except during storm runoff. These springs increase in flow as a result of rainfall and snowmelt, but most springs dry up during late summer. Flow in the Rabbit Creek channel has never completely dried up, according to local ranchers.

TABLE 14.

WATERSHED AND HYDROLOGIC STUDIES

RABBIT CREEK WATERSHED AREA: 2360 ACRES

DAILY DISCHARGE IN C.F.S. FOR 1969-70 WATER YEAR

Month / Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	.095	.174	.205	.172	.541	.328	.328	.434	.381	.213	.173	.120
2	.098	.174	.190	.194	.497	.326	.323	.425	.364	.207	.179	.110
3	.103	.174	.187	.204	.483	.332	.318	.417	.360	.190	.185	.110
4	.103	.162	.130	.192	.459	.331	.313	.420	.347	.184	.185	.172
5	.102	.150	.093	.170	.431	.323	.306	.434	.332	.193	.187	.150
6	.103	.158	.093	.166	.406	.313	.301	.454	.310	.211	.185	.150
7	.108	.168	.093	.162	.384	.377	.301	.462	.315	.198	.176	.143
8	.119	.166	.093	.160	.362	.481	.298	.473	.309	.197	.187	.137
9	.126	.162	.093	.152	.352	.423	.288	.502	.302	.196	.189	.139
10	.153	.162	.093	.141	.347	.413	.319	.518	.321	.196	.170	.126
11	.146	.162	.093	.131	.341	.432	.308	.503	.305	.197	.141	.114
12	.146	.162	.098	.124	.354	.429	.308	.500	.301	.193	.132	.114
13	.150	.162	.103	.117	.347	.400	.306	.497	.313	.203	.132	.114
14	.152	.162	.103	.124	.328	.424	.301	.480	.288	.217	.143	.114
15	.150	.164	.103	.124	.318	.424	.336	.470	.269	.199	.139	.115
16	.156	.168	.107	.147	.319	.411	.383	.462	.260	.179	.139	.117
17	.172	.168	.110	.205	.373	.406	.411	.465	.250	.175	.139	.117
18	.178	.164	.110	.210	.326	.389	.428	.477	.260	.175	.137	.117
19	.174	.160	.116	.194	.328	.376	.474	.486	.249	.169	.133	.130
20	.174	.158	.133	.195	.328	.360	.456	.502	.219	.171	.131	.133
21	.168	.158	.150	.252	.336	.342	.462	.477	.212	.166	.130	.128
22	.162	.158	.152	.373	.331	.344	.474	.465	.208	.158	.124	.124
23	.166	.156	.156	.315	.331	.344	.474	.545	.197	.153	.126	.122
24	.168	.154	.158	.422	.337	.349	.474	.573	.190	.143	.120	.124
25	.166	.154	.154	.381	.326	.347	.473	.497	.182	.155	.118	.124
26	.166	.155	.140	.491	.326	.363	.483	.491	.184	.151	.122	.126
27	.176	.156	.149	1.013	.321	.347	.462	.494	.220	.170	.114	.128
28	.184	.227	.162	.611	.324	.339	.460	.474	.259	.178	.117	.122
29	.178	.255	.190	.592		.345	.459	.453	.251	.182	.115	.119
30	.174	.250	.198	.552		.335	.442	.428	.231	.181	.126	.121
31	.174		.187	.549		.326		.404		.175	.128	
Month Avg.	.148	.170	.134	.285	.366	.370	.382	.472	.273	.183	.146	.126

Total runoff 0.93 inches or 182.9 acre feet.

TABLE 15

WATERSHED AND HYDROLOGIC STUDIES

LITTLE RABBIT CREEK WATERSHED AREA: 350 ACRES

DAILY DISCHARGE IN C.F.S. FOR 1969-70 WATER YEAR

Month / Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	.0086	.0201	.0123	.0201	.0554	.0380	.0426	.0726	.0317	.0201	.0001	0
2	.0168	.0201	.0134	.0201	.0473	.0380	.0380	.0699	.0293	.0149	0	0
3	.0122	.0201	.0122	.0219	.0505	.0344	.0426	.0732	.0259	.0095	0	0
4	.0122	.0201	.0205	.0237	.0404	.0308	.0426	.0734	.0236	.0091	0	0
5	.0122	.0201	.0219	.0237	.0380	.0344	.0380	.0732	.0202	.0143	0	0
6	.0122	.0235	.0201	.0237	.0380	.0344	.0380	.0760	.0198	.0155	0	0
7	.0105	.0237	.0201	.0237	.0380	.0422	.0380	.0686	.0274	.0087	0	0
8	.0102	.0237	.0201	.0237	.0380	.0486	.0380	.0688	.0262	.0065	0	0
9	.0122	.0237	.0201	.0237	.0380	.0408	.0380	.0730	.0266	.0054	0	0
10	.0171	.0237	.0201	.0237	.0380	.0401	.0474	.0737	.0306	.0060	0	0
11	.0122	.0237	.0201	.0237	.0344	.0362	.0426	.0638	.0259	.0052	0	0
12	.0122	.0237	.0295	.0274	.0370	.0365	.0380	.0549	.0253	.0038	0	0
13	.0122	.0237	.0308	.0361	.0380	.0380	.0372	.0638	.0293	.0032	0	0
14	.0122	.0237	.0308	.0407	.0344	.0401	.0556	.0583	.0300	.0023	0	0
15	.0124	.0237	.0308	.0338	.0308	.0380	.0663	.0530	.0289	.0020	0	0
16	.0228	.0234	.0273	.0441	.0324	.0380	.0691	.0536	.0273	.0019	0	0
17	.0274	.0201	.0237	.0516	.0520	.0426	.0760	.0534	.0299	.0010	0	0
18	.0225	.0201	.0237	.0426	.0375	.0473	.0771	.0535	.0259	.0010	0	0
19	.0201	.0201	.0295	.0403	.0309	.0519	.0949	.0540	.0204	.0010	0	0
20	.0201	.0201	.0389	.0356	.0309	.0565	.0899	.0592	.0172	.0010	0	0
21	.0162	.0201	.0378	.0557	.0309	.0565	.0805	.0530	.0163	.0011	0	0
22	.0122	.0194	.0309	.0696	.0309	.0565	.0749	.0506	.0131	.0009	0	0
23	.0122	.0155	.0347	.0425	.0309	.0565	.0767	.0713	.0143	.0009	0	0
24	.0162	.0201	.0308	.0555	.0292	.0526	.0795	.0504	.0108	.0006	0	0
25	.0201	.0201	.0308	.0426	.0309	.0473	.0777	.0442	.0097	.0006	0	0
26	.0201	.0201	.0250	.0628	.0309	.0511	.0873	.0446	.0092	.0007	0	0
27	.0204	.0166	.0237	.2810	.0331	.0473	.0828	.0452	.0190	.0010	0	.0003
28	.0241	.0179	.0291	.1002	.0345	.0473	.0760	.0436	.0288	.0010	0	.0005
29	.0237	.0145	.0381	.0805		.0473	.0732	.0352	.0277	.0007	0	.0005
30	.0219	.0123	.0214	.0662		.0473	.0734	.0352	.0160	.0005	0	.0005
31	.0201		.0201	.0610		.0473		.0320		.0002	0	
Month Avg.	.0163	.0206	.0254	.0491	.0368	.0440	.0610	.0579	.0229	.0045	0	.0001

Total runoff 0.700 inches or 20.42 acre feet.

SEDIMENTATION

Automatic pumping sediment samplers were maintained at both the Rabbit Creek and Little Rabbit Creek runoff stations throughout the water year. During the storm of January 27, 1970, runoff rates were too low to actuate the sampler turn-on devices and no samples were obtained. Also, snowmelt runoff rates during April, May, and June were extremely low and the water visibly clear. No facilities have been constructed to measure bedload. Total sediment yield was obviously very low and consistent with runoff during the year.

WATER BALANCE COMPUTATIONS

Precipitation, as calculated from shielded and unshielded gage catches, on the Rabbit Creek Watershed during the 1969-70 water year varied from 16.06 inches at an elevation of 4615 feet to 22.70 inches at 5875 feet, which was about the same as 1968-69. Generally, water year precipitation was about ten percent greater than normal at surrounding weather station and snow courses.

A water balance computing procedure was used to show the disposition of precipitation at two representative soil moisture and precipitation sites. Tables 16 and 17 list (1) soil moisture measurement dates in Column 1, (2) measured soil moisture in the profile in column 2, (3) computed precipitation which occurred during the interval between soil moisture measurements in column 3, (4) runoff amounts at the outflow station of the 2360-acre watershed in column 4, (5) computed loss of moisture during each interval by evaporation, transpiration, and deep percolation in column 5, and (6) moisture conditions at the soil surface when measurements were made in column 6. Moisture losses during each period were computed by the simple water balance equation:

$$P \pm SM - R = L$$

where P is precipitation, SM is soil moisture increase or decrease, R is runoff, and L is moisture loss by evaporation, transpiration or percolation below the moisture measurement depth.

TABLE 16. WATER BALANCE COMPUTATIONS FOR SITE 15194 - RABBIT CREEK WATERSHED, 1969-70 WATER YEAR

Soil Moisture Measurement Dates	Measured Soil Water 0-6 Ft. (Inches)	Computed Precip. During Period (Inches)	Measured Runoff During Period (Inches)	Computed Moisture Loss During the Period (Inches)	Remarks of Surface Conditions
	SM	P	R	L	
9-29-69	21.07				Dry
		1.22	-.05	.72	
10-30-69	21.52				Moist
		.24	-.10	.24	
12-2-69	21.42				Dry
		5.64	-.18	0	
2-12-70	26.88				Wet
		1.47	-.10	1.58	
3-12-70	26.67				2" Snow
		1.03	-.05	1.85	
3-26-70	25.80				Snow-partial cover
		.09	-.04	.94	
4-9-70	24.91				Dry
		2.65	-.18	1.92	
5-9-70	25.46				Moist
		1.19	-.07	1.42	
6-18-70	25.16				Moist
		.82	-.03	1.53	
7-2-70	24.42				Dry
		.47	-.04	1.50	
7-22-70	23.35				Dry
		.04	-.01	1.03	
7-30-70	22.35				Dry
		.09	-.02	.37	
8-14-70	22.05				Dry
		0	-.02	.48	
8-27-70	21.55				Dry
		.75	-.02	.58	
9-10-70	21.70				Dry
		.36	-.02	.74	
9-24-70	21.30				Dry
TOTALS		16.06	-.93	14.90	

1969-70 WATER BALANCE:

P = 16.06 inches
SM = 21.07 - 21.30 = -.23 inches
R = -.93
L = P±SM - R = 16.06 - .23 - .93 = 14.90 inches

TABLE 17. WATER BALANCE COMPUTATIONS FOR SITE 33234 - RABBIT CREEK WATERSHED, 1969-70 WATER YEAR

Date	Measured Soil Water 0-5 Ft. (Inches)	Computed Precip. During Period (Inches)	Measured Runoff During Period (Inches)	Computed Moisture Loss during Period (Inches)	Remarks of Surface Conditions
9-29-69	8.80				Dry
		2.01	-.05	1.06	
10-30-69	9.70				Moist
		.38	-.10	.48	
12-2-69	9.50				Dry
		8.76	-.18	0	
2-12-70	18.08				Wet
		1.70	-.10	2.43	
3-12-70	17.25				Snow
		.96	-.05	1.51	
3-26-70	16.65				Snow
		.56	-.04	1.77	
4-9-70	15.40				Dry
		2.93	-.08	1.15	
5-9-70	17.10				Moist
		1.81	-.17	3.49	
6-18-70	15.25				Moist
		1.37	-.03	2.16	
7-2-70	14.43				Dry
		.65	-.04	2.14	
7-22-70	12.90				Dry
		.03	-.01	.52	
7-30-70	12.40				Dry
		.07	-.02	1.45	
8-14-70	11.00				Dry
		0	-.02	.48	
8-27-70	10.50				Dry
		.95	-.02	.63	
9-10-70	10.80				Dry
		.52	-.02	.60	
9-24-70	10.70				Dry
TOTALS		22.70	-.93	19.87	

1969-70 WATER BALANCE:

P = 22.70 inches
SM = 8.80 - 10.70 = -1.90 inches
R = -.93 inches
L = 22.70 - 1.90 - .93 = 19.87 inches

Water balance computations for the 1969-70 water year at site 33234, Table 17, at the 5875-foot elevation showed only 0.93 inch of runoff (average from weir measurements) and 22.70 inches of precipitation. Therefore, only about four percent of the precipitation was accounted for in runoff and 96 percent was consumed where it fell. Since precipitation measurements include considerable snowfall, there was opportunity for snow blowing off or onto the soil moisture measuring sites, but the data show good agreement between soil moisture changes and precipitation except during February and March. Overall, the high moisture losses are consistent with better vegetation cover at higher elevations.

Reliability of water balance data should be improved in future years as soil moisture sites stabilize, additional snow measurements are made, and data are more thoroughly analyzed.

SUMMARY

Precipitation on the Rabbit Creek Watersheds during the 1969-70 water year was about 10 percent above normal, based on data from the Reynolds Creek Watershed. About one-third of the yearly precipitation occurred during December and January. Much of the January precipitation came in the form of rain, which melted the shallow snow accumulation and caused high soil moisture levels. Runoff rates and volumes, however, were very low, with only 0.93 inch runoff from the Rabbit Creek Watershed and 0.70 inch from the Little Rabbit Creek Watershed. Similarly, sediment yields were very low and streams flowed visibly clear. Snowmelt from deep drifts around the perimeter of the watershed contributed to runoff. Therefore, at least 95 percent of the precipitation was evaporated or transpired where it fell. Generally, soil moisture conditions were favorable for early spring and summer grazing, but the late summer was very dry as usual.